REMARKS

In the Office Action dated March 5, 2009, the Examiner rejects claims 1-16 and 20-27. Specifically, the Examiner maintains the following rejections:

A. 35 U.S.C. § 102(b)

1. Claims 1, 2, 4, 6, 8-10 and 13 as being anticipated by Nagasubramanian et al. (US Pat. No. 5,599,355).

B. 35 U.S.C. §103(a)

1. Claims 3 and 7as being unpatentable over Nagasubramanian et al. in view of Munshi (US Pat. No. 6,645,675).
2. Claims 5, 12, 14 and 15 as being unpatentable over Nagasubramanian et al. in view of Hong et al.
3. Claim 16 as being unpatentable over Nagasubramanian et al. as applied to claim 15 and in further view of Triplett (US Pat. No. 3,566, 985).

The Examiner makes the following new rejections under 35 U.S.C. §103(a):

1. Claims 11 and 20-23 as being unpatentable over Nagasubramanian et al. as applied to claims 1, 2, 6, 7, 9, 10 and 13, and further in view of Holland et al. (US 4,765,864) as evidenced by Speakman.
2. Claims 24-25 as being unpatentable over Nagasubramanian et al. in view of Hong et al. as applied to claims 1, 2, 4-6, 8-10 and 12-15, and in further view of Holland as evidenced by Speakman.
3. Claims 26-27 as being unpatentable over Nagasubramanian et al. in view of Hong et al. and Triplett as applied to claims 1, 2, 4-6, 8-10 and 12-16, and in further view of Holland as evidenced by Speakman.

With this Amendment, Applicants have amended claims 1, 10, 15 and 16. Claim 2 has been canceled without prejudice. Claims 17-19 and 28-29 were previously canceled. After entry of this Amendment, claims 1, 3-16 and 20-27 are pending in the Application. Reconsideration of the application is respectfully requested in light of the amendments and remarks made below.

Applicants would like to thank the Examiner and his Supervisor for the interview held on April 30, 2009, during which the Nagasubramanian et al. reference was discussed. No claim amendments were agreed upon.

Rejections under 35 U.S.C. §102(b)

The Examiner rejects claims 1, 2, 4, 6, 8-10 and 13 under 35 U.S.C. §102(b) as being anticipated by Nagasubramanian et al.

Claim 1 (and claims 2, 4, 6, 8 and 9 that depend therefrom) has been amended to clarify that the electrolyte layer consists essentially of a pattern of individual insulating particles and electrolyte. The individual insulating particles have a plurality of interstitial spaces therebetween, with electrolytes occupying at least some of the interstitial spaces. Each individual insulating particle in the pattern is selectively arranged directly on one of the cathode and anode, the individual insulating particles arranged such that the cathode and the anode do not contact each other. The amendments are supported in the specification at least in paragraphs [0037], [0040] and FIGS. 5A, 5B, 5D and 6A-C.

Nagasubramanian et al. fails to teach or suggest an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode. As stated by the Examiner on page 3 of the Office Action, the composite solid electrolyte film 10 of Nagasubramanian et al. comprises a polyelectrolyte, a lithium salt, and inorganic particles such as alumina. A uniform suspension of particles is cast into the film.

Nagasubramanian et al. teaches a "method of forming large area, uniform, composite, solid electrolyte films." (Col. 3, ll. 37-38). The film is utilized in a thin, solid state battery, not produced directly on a cathode or anode. (Col. 4, ll. 51-52). Applicants discuss the drawbacks of electrolyte films, in particular, the inability to form the films as thin as those disclosed by Applicants. (*See* paragraph [0005]).

Because Nagasubramanian et al. does not teach or suggest each and every element of claim 1, Nagasubramanian et al. cannot anticipate it. At least by their dependency, claims 4, 6,

8 and 9 are also not anticipated by Nagasubramanian et al. Claim 2 has been canceled. Applicants respectfully submit that claims 1, 4, 6, 8 and 9 are in condition for allowance, notice of which is requested.

Claim 10 (and claim 13 that depends therefrom) recites a method for manufacturing a battery comprising applying individual insulating particles directly to at least one of a cathode and an anode, applying an electrolytic polymer to at least some of a plurality of interstitial spaces between the individually applied insulating particles to form an electrolyte layer and layering the cathode and the anode such that the electrolyte layer is formed in between.

Nagasubramanian et al. fails to teach or suggest an electrolyte layer formed by first applying individual insulating particles directly to at least one of a cathode and an anode and then applying an electrolytic polymer to at least some of a plurality of interstitial spaces between the individually applied insulating particles. As stated by the Examiner on page 5 of the Office Action, a suspension is produced and the mixture cast into films of electrolyte layer.

Because Nagasubramanian et al. does not teach or suggest each and every element of claim 10, Nagasubramanian et al. cannot anticipate it. At least by its dependency, claim 13 is also not anticipated by Nagasubramanian et al. Applicants respectfully submit that claims 10 and 13 are in condition for allowance, notice of which is requested.

Rejections under 35 U.S.C. §103(a)

1. The Examiner maintains his rejection of claims 3 and 7 under 35 U.S.C. §103(a) as being unpatentable over Nagasubramanian et al. as applied to claims 1, 4, 6, 8-10 and 13 and in further view of Munshi.

Nagasubramanian et al. is discussed above with respect to claim 1, upon which claims 3 and 7 depend. Munshi discloses methods of making a solid polymer electrolyte including stamping the polymer/salt/filler/ionic conductor mixture onto a substrate. In certain other methods, the process of making a solid polymer electrolyte includes adding a liquid organic solvent to the mixture and evaporating the liquid organic solvent prior to optionally curing the solid polymer electrolyte. In some of these solvent-based casting or coating methods, the process

of forming the mixture into a solid polymer electrolyte may include employment of any of a variety of methods, including knife coaters, doctor blade coaters, wire-wound bar coaters (Mayer rods), air knife (air doctor) coaters, squeeze roll (kiss coaters), gravure coaters, reverse roll coaters, cast film coaters and transfer roll coaters. (Col. 9, ll. 9-24). Applying a solution with any one of the methods to a substrate, as disclosed in Munshi, does not achieve the electrolyte layer recited in claim 1. Accordingly, combining Munshi with Nagasubramanian et al. fails to teach, suggest or render obvious all the features of claim 1 and its dependent claims, including claims 3 and 7. Applicants respectfully submit that claims 3 and 7 are in condition for allowance.

2. The Examiner maintains his rejection of claims 5, 12, 14 and 15 under 35 U.S.C. §103(a) as being unpatentable over Nagasubramanian et al. in view of Hong et al. Nagasubramanian et al. is discussed above with respect to claim 1, upon which claim 5 depends and is discussed above with respect to claim 10, upon which claims 12 and 14 depend.

Hong et al. teaches the use of a woven separation membrane that is impregnated with the electrolyte solution. The separation membrane is provided on the surface of a supporting body. (Pg. 13, ll. 22-26 and FIG. 3). More particularly, Hong et al. teaches "an electrochemical cell comprising an anode, a cathode, and a separation membrane which is installed between the anode and the cathode, the separation membrane including a supporting body of the separation membrane, a polymer membrane formed on the supporting body, and a polymer binder membrane formed on the polymer membrane." (Pg. 6, ll. 7-11). The anode and cathode are thermally compressed on the polymer binder to create the cell. (Pg. 25, ll. 11-12). Hong et al. fails to teach or suggest an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode.

Neither Nagasubramanian et al. nor Hong et al., alone or in combination, teach, suggest or render obvious an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being

selectively arranged directly on one of the cathode and anode as recited in claims 1 and 10. Accordingly, claims 5, 12 and 14, which depend from claims 1 and 10, are in condition for allowance.

Claim 15 recites a battery assembly comprising multiple connected batteries, wherein each of the connected batteries comprises layered cell elements including a cathode and an anode that are facing each other and an electrolyte layer between the cathode and the anode, wherein lithium ions can be inserted into and removed from the cathode and the anode through the electrolyte layer. The electrolyte layer consists essentially of individual insulating particles individually applied directly to at least one of the cathode and the anode and affixed thereto, and electrolytes occupying at least some of a plurality of interstitial spaces between the individual insulating particles.

As argued above, neither Nagasubramanian et al. nor Hong et al., alone or in combination, teach, suggest or render obvious an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode as recited in claim 15. Accordingly, claim 15 is in condition for allowance.

3. The Examiner maintains his rejection of claim 16 under 35 U.S.C. § 103(a) as being unpatentable over Nagasubramanian et al. in view as Hong et al. as applied to claim 15 and in further view of Triplett. Triplett is cited for the electric vehicle driven by an electric motor powered by a DC battery having a plurality of cells.

However, as argued above, neither Nagasubramanian et al. nor Hong, alone or in combination, teach, suggest or render obvious an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode as recited in claim 15, from which claim 16 depends. Triplett in combination with these two references fails to cure this deficiency as Triplett also fails to teach or suggest such an electrolyte layer. Applicants therefore respectfully submit that claim 16 is in allowable form.

4. Claims 11 and 20-23 are newly rejected as being unpatentable over Nagasubramanian et al. as applied to claims 1, 2, 6, 7, 9, 10 and 13, and further in view of Holland et al. (US 4,765,864) as evidenced by Speakman. Nagasubramanian et al. is discussed above with respect to claim 1, upon which claims 20 and 21 depend, and is discussed above with respect to claim 10, upon which claims 11, 22 and 23 depend.

Holland et al. discloses the use of an ink-jet printer for placing an electrolytic medium in the wells of silicon wafers. There is no discussion of using ink jets to manufacture batteries to power vehicles. Holland et al. fails to teach or suggest an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode, failing to cure the deficiencies of Nagasubramanian et al.

Speakman is cited for the use of ink jet printing in applications such as catalysts and electrodes. Speakman discloses the use of ink jet "for rechargeable electronically active smart cards for banks, theatres, airports, train/bus stations, conventions and conferences. Such cards will also house a mini display so that the card holder can access data independent of the end use interrogation equipment. . . . Typical dimensions are battery height less than or equal to 2 mm, diameter less than or equal to 20 mm. Recharge cycles have been shown to be as high as 1,000 times." (Pg. 18, ll. 1-11). There is no discussion of using ink jets to manufacture batteries to power vehicles. Speakman fails to teach or suggest an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode, failing to cure the deficiencies of both Nagasubramanian et al. and Holland.

The combination of Nagasubramanian et al., Holland and Speakman fail to teach, suggest or render obvious the subject matter of claim 1 and 10. Accordingly, claims 11 and 10-23 are in condition for allowance, notice of which is requested.

5. Claims 24 and 25 are newly rejected as being unpatentable over Nagasubramanian et al. in view of Hong et al. as applied to claims 1, 2, 4-6, 8-10 and 12-15, and in further view of Holland as evidenced by Speakman.

Claims 24 and 25 depend from claim 15, which is argued above with respect to Nagasubramanian et al. and Hong et al. Namely, these references fail to teach, suggest or render obvious an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode as recited in claim 15.

Holland discloses the use of an ink-jet printer for placing an electrolytic medium in the wells of silicon wafers. There is no discussion of using ink jets to manufacture batteries to power vehicles. Holland fails to teach or suggest an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode, failing to cure the deficiencies of Nagasubramanian et al. and Hong et al.

Speakman is cited for the use of ink jet printing in applications such as catalysts and electrodes. Speakman discloses the use of ink jet "for rechargeable electronically active smart cards for banks, theatres, airports, train/bus stations, conventions and conferences. Such cards will also house a mini display so that the card holder can access data independent of the end use interrogation equipment. . . . Typical dimensions are battery height less than or equal to 2 mm, diameter less than or equal to 20 mm. Recharge cycles have been shown to be as high as 1,000 times." (Pg. 18, ll. 1-11). There is no discussion of using ink jets to manufacture batteries to power vehicles. Speakman fails to teach or suggest an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode, failing to cure the deficiencies of each of Nagasubramanian et al., Hong et al. and Holland.

Accordingly, due to their dependency on claim 15, claims 24 and 25 are not taught, suggested or rendered obvious by the cited combination and are in condition for allowance, notice of which is requested.

6. Claims 26-27 are newly rejected as being unpatentable over Nagasubramanian et al. in view of Hong et al. and Triplett as applied to claims 1, 2, 4-6, 8-10 and 12-16, and in further view of Holland as evidenced by Speakman.

Triplett is cited for the electric vehicle driven by an electric motor powered by a DC battery having a plurality of cells. However, as argued above, none of Nagasubramanian et al., Hong et al. Holland and Speakman, alone or in combination, teach, suggest or render obvious an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode as recited in claim 15, from which claims 26 and 27 depend. Triplett in combination with these four references fails to cure this deficiency as Triplett also fails to teach or suggest such an electrolyte layer. Applicants therefore respectfully submit that claims 26 and 27 are in allowable form.

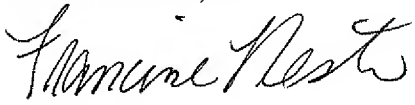
Conclusion

It is submitted that this Amendment has antecedent basis in the application as originally filed, including the specification, claims and drawings, and that this Amendment does not add any new subject matter to the application. Reconsideration of the application as amended is requested. It is respectfully submitted that this Amendment places the application in suitable condition for allowance; notice of which is requested.

If the Examiner feels that prosecution of the present application can be expedited by way of an Examiner's amendment, the Examiner is invited to contact undersigned at the telephone number listed below.

Respectfully submitted,

YOUNG BASILE HANLON MACFARLANE & HELMHOLDT, P.C.



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